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ABSTRACT

Change roles in educational innovation have either not been taken at all or have been inappropriately or inadequately taken. By dividing the innovation process into four parts--research, development, diffusion, and adoption--phases within each division can be identified, criteria set up, and evaluations made. Also, with attention to this four-part division of the innovational process, change roles for each phase may be assigned to agencies and individuals, including the federal government, schools of education, universities, state governments, public school systems, foundations, and researchers in diverse disciplines. Particular emphasis needs to be placed on the suggestions that schools of education establish graduate programs to train educational engineers, quality control experts, and educational field agents; that local school systems redirect their efforts in research and curriculum to focus on development; and that state education agencies and the Office of Education view the Elementary and Secondary Education Act of 1965 as a vehicle for establishing a strategy of educational change. (MF)

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AN EXAMINATION OF POTENTIAL CHANGE ROLES IN EDUCATION

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Seminar on

Innovation in Planning School Curricula

October, 1965

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Section I

A Logical Structure for Examining Change Roles in Education

This paper will propose a classification schema of processes related to and necessary for change in education. Through an explication of these processes, the authors will attempt to analyze extant and projected change roles in education.

The logical structure presented in this paper grew in response to years of frustration in trying to talk about the change process in education in global terms. How many articles have been published in education bemoaning the research reports which have been gathering dust on library shelves instead of influencing school practice? It seems to us that such disuse is probably appropriate since most research, even that which can be defended from a scientific point of view, has little to say to practitioners. And why should it? Research is conducted to advance knowledge and not directly to influence practice; it has to be evaluated on its own terms - terms of internal and external validity. But researchers are being castigated for not tackling "real problems" while practitioners build up guilt feelings because they are not using research to make decisions. That this dilemma has practical and negative impact on men working in the field is neatly illustrated by Miles who noted that Richard Suchman (and his "discovery method") was on the one hand labeled "a Messiah" by some researchers and conversely belabored as a would-be curriculum developer by curriculum people.[1]

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[1] Matthew Miles, "Some Propositions on Research Utilization in Education." Discussion document for AERA Committee on Research Utilization, March 23, 1965, p. 13.

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The genesis of this dilemma seems to us to lie in an over-simplification of, or ignorance of, the range of processes and functions which affect change in a social process field. Should public schools, "allocate an appropriate proportion of their annual operating budgets - not less than one percent- for the support of research, experimentation, and innovation," as recommended by the NEA Project on Instruction?[2] The answer to that question appears to depend, first, on what those terms mean, and second, on how public schools will be related to other change agents and change mechanisms in education. It is possible and reasonable to argue that operating agencies in a social process field, i.e., schools in the case of education, should have internalized goals which relate directly to self-improvement of the operating system. If this is an acceptable proposition, the objective of advancing knowledge in the social process field as a whole, i.e. research, would appear to be inappropriate to the school, but formulating a new solution to an operating problem, i.e., invention, might be appropriate if other agencies and individuals were not mobilized to provide this service. The function most appropriate to the school, however, would seem to be trying, installing, and institutionalizing changes which have an efficacious impact on the system, and the "research-like" emphasis of the system's activities in accomplishing this function might be described with a term such as "operations research" or "quality control."

Many individuals have begun to recognize that something or someone is missing in our thinking. Miles illuminates this point

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[2]National Education Association Project on Instruction, Schools for the Sixties: A summary of the Report of the NEA Project on Instruction. Washington, D.C.: National Education Association of the United States, p.5.

by attempting to specify divergent research utilization roles, e.g., the engineer, the field tester, the quality control man, the county agent (its equivalent), and the home demonstration agent (its equivalent).[3] The same effort was made by Kimball Wiles in his presentation to the ASCD Seminar on Strategies for Curriculum Change when he allocated such functions or processes as basic research, field testing, and evaluation to agencies outside the school system, and stated that, "Innovation occurs outside the school system. Diffusion and integration occur within the system."[4] At the same session, Ronald Lippitt talked about the "gap between new knowledge and educational engineering," a phenomenon he refers to as the retrieval of expertness.[5] The call for the educational engineer, the translator, the middle-man, has become common in educational meetings and publications.

It is toward this same area that we have been directing our thinking. If it is true that the relationship of various processes and functions in the change process in education have been oversimplified, what concepts serve to describe the evidently more complicated relationship adequately? If it is true that we need a new breed of middle men or organizations; what is it that they are in

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[3] Op. cit., pp. 12-13.

[4] Kimball Wiles, "An Historical Look at Educational Change Processes," (A summary prepared by The Center for the Study of Instruction), Washington, D.C.: National Education Association, 1965, p.3.

[5] Ronald Lippitt, "Roles and Processes of Curriculum Change," (A summary prepared by The Center for the Study of Instruction), Washington, D.C.: National Education Association, 1965, p.2.

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the middle of? Figure 1 represents our best effort to date to explicate this middle ground and these more useful concepts, and will form the basis for the remainder of our discussion in this paper.

Before examining this figure in detail, it is imperative that several caveats be called to your attention, and that certain basic terms be defined in order to make the schema intelligible.

The caveats are two in number: first, the schema has been constructed on logical grounds, largely unsupported, by empirical research. Second, the schema represents a uni-dimensional analysis of change roles, but of course such roles are influenced and determined by a multi-dimensional range of variables not entirely accommodated by the structure.

To return to the first of these limitations, there is indeed little empirical research to which the examiner can turn, particularly in education. Richard Carlson's studies of the school superintendent have examined one individual role in relation to one facet of the change process (adoption).[6] Henry Brickell discussed institutional roles relating to the change process in one state based on an impressionistic examination of how change occurs in schools.[7] The bulk of the change research in education, conducted over a 25-year span by Paul R. Mort and his students, concentrated on a single phase of the change process (actual adoption of an invention by a school district) and only incidentally referred to the role of change

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[6]Richard O. Carlson, Adoption of Educational Innovations, Eugene, Oregon: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965.

[7]Henry M. Brickell, Organizing New York State for Educational Change. Albany, New York: State Educational Department, 1961.

agents. Even where this latter work examines an institutional change role (e.g., state education agencies), the data are nearly impossible to use since Mort employed what Miles refers to as "common sense categories" unrelated to change research going on in other fields.[8] The most direct scientific lineage for the structure comes from attempts to classify the innovation process in other areas of change research, as for example, in rural sociology.[9]

The second delimitation is more severe and not unrelated to the first. A classification of elements in the change process is only one vantage point from which the question of change roles can be viewed, and taken by itself, does not account for other influential variables. For example, inventions have characteristics of their own. Chin has projected a five category classification of change: substitution, alteration, perturbation and variation, restructuring, and value orientation change.[10] It is highly likely that change roles would be altered drastically in relation to inventions requiring changes of these various types. Substitution (substituting one element for another already present) may well be typical of intra-system initiation. Alteration (minor change in

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[8]Matthew Miles, "Barriers to Change in Public Schools." Change Processes in the Public Schools. Eugene, Oregon: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965.

[9]See, for example, George M. Beal, Everett M. Rogers, and Joe M. Bohlen, "Validity of the Concept of States on the Adoption Process." Rural Sociology, 22: 166-168, 1957.

[10]Robert Chin, "Models and Ideas About Changing." Symposium on Identifying Techniques and Principles for Gaining Acceptance of Research Results on Use of Newer Media in Education, Lincoln, Nebraska: University of Nebraska, 1963.

what is already adopted) may be effected by fiat through a duly constituted administrative authority. Restructuring may call into play a complex interaction of intra-and-extra system individual and institutional change agents.

Another example of the alternate structures which influence change roles is provided by the monograph Change Processes in the Public Schools cited earlier in this paper. Carlson begins with a discussion of the change process oriented to functions much in the manner which will be employed in the present paper. Miles in the same volume brings organizational theory to bear on the question of characteristics of the receiving system or target system. Gallaher assumes an anthropological view with particular emphasis on the role of the school administrator as advocate within a formal organizational setting. And Rogers picks up the question of the characteristics of the innovator. Any of those emphases could be assumed as the focus for discussing change roles. All should be considered eventually as research in this field gains sophistication.

Before proceeding, there are a few terms which will be used frequently, and we hope consistently, in the paper for which definitions should be provided. We will employ the terms change agent and innovator interchangeably and will mean, "an individual . . . consciously playing the role of an initiator with respect to an /Invention/ so that /the invention/ may be accepted by another individual, or in an organization or group . . . ."[11] When referring to a group or institution playing the role of initiator we will employ the designa-

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[11]Harbans Singh Bhola, Innovation Research and Theory. Columbus, Ohio: School of Education, The Ohio State University, 1965, p.4.

tion change mechanism. The terms target system or adopter will be used to identify, "an individual, group, or institution on which an innovator is working to seek acceptance of an /invention/ . . . ." [12] The term innovation will refer to the process of change, and the term invention will mean "(1) an idea or practice which departs from those generally prevailing among an aggregate of people who may be regarded as targets of change directed effort; or (2) a change in technology (a material object with definitions of its use)." [13] Further specialized definitions of terms within the structure should become apparent from the discussion of the schema following.

An Overview of the Schema

Let us turn, then, to a discussion of Figure 1.

The first proposition underlying the schema is that all social process fields must utilize a wide range of processes or functions which take place as the field attempts to develop and subsequently integrate new knowledge into more effective practice. Through logical analysis and synthesis of empirical descriptions of the innovation process in other fields we have arrived at a simple four-phase division of these processes:

1. Research
2. Development
3. Diffusion
4. Adoption

These categories are, in turn, sub-divided into more discrete elements representing stages in several process phases.

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[12] Ibid., p. 6.

[13] Ibid., p. 12.

FIGURE I

A CLASSIFICATION SCHEMA OF PROCESSES RELATED TO AND NECESSARY FOR CHANGE IN EDUCATION

	RESEARCH	DEVELOPMENT		DIFFUSION		ADOPTION		
		INVENTION	DESIGN	DISSEMINATION	DEMONSTRATION	TRIAL	INSTALLATION	INSTITUTIONALIZATION
OBJECTIVE	To advance knowledge	To formulate a new solution to an operating problem or to a class of operating problems, i.e., to innovate	To order and to systematize the components of the invented solution; to construct an innovation package for institutional use, i.e., to engineer	To create widespread awareness of the invention among practitioners, i.e., to inform	To afford an opportunity to examine and assess operating qualities of the invention, i.e., to build conviction	To build familiarity with the invention and provide a basis for assessing the quality, value, fit, and utility of the invention in a particular institution, i.e., to test	To fit the characteristics of the invention to the characteristics of the adopting institution, i.e., to operationalize	To assimilate the invention as an integral and accepted component of the system, i.e., to establish
CRITERIA	Validity (internal and external)	Face Validity (appropriateness) --- Estimated Viability --- Impact (relative contribution)	Institutional Feasibility --- Generalizability --- Performance	Intelligibility --- Fidelity --- Pervasiveness --- Impact (extent to which it affects key targets)	Credibility --- Convenience --- Evidential Assessment	Adaptability --- Feasibility --- Action	Effectiveness --- Efficiency ---	Continuity --- Valuation --- Support
RELATION TO CHANGE	Provides basis for invention	Produces the invention	Engineers and packages the invention	Informs about the invention	Builds conviction about the invention	Tries out the invention in the context of a particular situation	Operationalizes the invention for use in a specific institution	Establishes the invention as a part of an ongoing program; converts it to a "non-innovation"

The second proposition of the figure is that objectives or goals can be stated discretely for each phase and stage and, consequently, that appropriate criteria can be established in terms of which each phase can be evaluated or assessed. This last point has caused confusion in every presentation of the schema. There are always those who contend that since inventions must be evaluated, one discrete stage in the process should be labeled evaluation. Evaluation is obviously appropriate but it needs to be conducted discretely at <u>each</u> stage of the process. For example, failure to disseminate information about a designed invention can occur, but while this failure can disrupt the process of innovation it has nothing to say to us about the invention itself, the design of the invention, or the research, if any, undergirding the invention.

The third proposition of the figure is that the change process is quasi-sequential from research to adoption. The seemingly sequential flow, however, can easily be over emphasized. Research may lead to the formulation of solutions to operating problems to be sure. However, the existence of operating problems may stimulate research, research findings may emerge from invention efforts, and inventions may occur which have shaky or non-existent research foundations. Research is a necessary element in the continued development of the change process in education but there is no linear relationship between discrete research projects or groups of research projects and individual inventions. Take, for example, the present pattern of in-service education for teachers in this country. On the face of it, the effort to tie in-service development to "canned" master's degree programs has been a notorious failure. Enough is

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known so that a program of re-organization and vivification of the entire pattern of school district-university involvement in improving teacher behavior in-service could be mounted today and demonstrated six months from now. The rationale supporting this improvement effort (i.e., invention) would involve not so much research as the application of well-known practical principles of formal organization. True, the application of research on teacher characteristics to the design of new experiences for practicing teachers would be a practical long term strategy for continuing improvement, but marked improvement could be made immediately with little or no reference to a specific base of new knowledge. This is simply to say that the processes being described are inter-related and mutually reinforcing but the relationship is looping rather than linear. Each phase has an existence of its own which does not depend solely on what precedes or follows it.

The Research Process Phase

This is the one phase which, in the schema, is not divided into stages. Such a division could be accomplished through the application of conventional classifications of research, e.g., basic-applied, or through a classification based on the objectives of research, e.g., to describe, to compare, to conceptualize, to test.[14] There seems to be no necessity to do this, however, since a single objective, "to advance knowledge," covers the various stages which could have been used further to define the phase. Research provides the basis for invention, in a general sense, but the only criteria which can

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[14]Egon G. Guba and David L. Clark, "Types of Educational Research," Chapter IV in William J. Ellena and Bruce Biddle (Eds.), Research and the School Administrator, AASA, in press.

be used to assess research are internal validity - the extent to which the hypotheses are tested or the questions are answered unambiguously, and external validity - the extent to which the findings are generalizable to the population required by the hypotheses or questions being considered. This may be a mild over-statment of fact since questions of significance can be raised in relation to the problem being studied, but it serves to illustrate the point that research must be assessed in its own terms. "Did the research, in fact, advance knowledge?" is a question which can be answered without reference to whether the research affected practice. A "no" answer to the second question probably tells you nothing about the research. It may illustrate simply that development and diffusion mechanisms were not functional in the field in which the research was done. Often this has been precisely the case in the field of education.

The Development Process Phase

This phase involves two stages - invention and design. Invention is defined as the formulation of a new solution to an operating problem or a class of operating problems, e.g., team teaching as an antidote to some of the difficulties of the self-contained classroom unit. As Brickell notes in his monograph the conditions conducive to invention are quite different from those required by research [15] It is equally true that the criteria which can properly be applied to these two functions differ sharply. On the face of it, does team teaching appear to be an appropriate attack on the weaknesses of elementary school classroom organization? Is there face validity in the idea?

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[15] Op. cit.

if one assumes that the teacher's lack of knowledge in a variety of fields is the basic weakness in the self-contained classroom, then team teaching appears to have face validity as an invention. What is the best, rough estimate one can obtain of its viability? If it increases school costs by 500% it probably won't go any further. What is the best first estimate one can obtain of the breadth of its impact? Is it worth pursuing in terms of potential significance to education? These are admittedly gross criteria but it is our contention that they should be. It is certainly better to err on the side of permissiveness at the invention stage than to cut off good ideas because they cannot immediately be proven to be valid and viable.

A "raw" invention is typically unusable in a practical sense. To discover a chemical which retards the development of mold in bread is one thing; to incorporate it into the process of producing and marketing bread is another. It is the design of packaging stage which orders and systematizes the invented solution into a package appropriate for institutional use. The best recent illustrations of attention to the design of an invention have been provided by the course content improvement projects of the National Science Foundation. The preliminary work of the Physical Science Study Committee (PSSC) invented a solution to an operating problem, i.e., updated substance for secondary school physics. Had the solution been left at this stage it is highly unlikely that it would have had impact on schools. After packaging in a usable and integrated form, however, it was ready for the processes of diffusion and adoption; and it has had a considerable impact on secondary education.

An even more telling example of the function of design in the innovation process is provided by standardized tests. It is doubtful if any area of educational research has had a greater influence on schools than that of tests and measurements. We contend that this is true precisely because the results of this reasearch were designed, in the form of standardized tests, for use in the school setting. Had the results of this research effort not been engineered in the form of group tests, schools could hardly have been expected to do this for themselves, and the relevant content derived from these studies would now be summarized in a chapter of an undergraduate teacher education text on "characteristics of students."

Considerably greater precision can be brought to bear at this stage of development in establishing criteria and evaluating the product than was true at the invention stage. The pattern of evaluation typically followed is called field testing; its intent is chiefly to assess the feasibility of the design in an institutional setting, the generalizability of the design to diverse institutional settings, and the performance of the design, often relative to an existing design. Ideally, this field testing follows a period of intensive, small sample evaluation which the designers or engineers have conducted during the period when the design was taking shape. In a crude sense, this is comparable to the process employed by industrial engineers who seek naturalistic or uncontrolled settings to field test designs which have shown promise through controlled testing patterns, e.g., driving an auto whose components have been thoroughly laboratory tested across the country to determine its performance under "real" conditions.

The Diffusion Process Phase

The first stage of the diffusion phase, dissemination, is concerned with creating widespread awareness of the existence and general nature of the invention among practitioners. When properly carried out, dissemination increases the number of options available to the professional from which he may choose in practice. The criteria which can be applied to dissemination are essentially communication criteria: pervasiveness, the extent to which information has reached the target system; intelligibility and fidelity, the extent to which information has arrived in understandable and non-distorted form; and impact, the extent to which information has affected the behavior of key targets. Note again the self-contained aspects of this stage in the process. The stage can be assessed in its own right. The process of dissemination does not purport to effect change in schools but only to create widespread awareness of the existence of an invention.

The stage of diffusion labeled demonstration is more apt to be misunderstood than any other stage because of the loose way in which this term has been employed in education, e.g., demonstration schools (usually meaning university sponsored and housed elementary and secondary schools), or demonstration exhibits (usually offering testimonial to the effectiveness of a practice initiated in some institutional setting). In this case, the term means the provision of an opportunity for the target system to examine and assess the operating qualities of the invention. This implies interaction between the demonstrator or demonstration and the target system- a real

chance for evidential assessment of the invention by a competent professional. Certainly a demonstration, if nothing else, must be credible to the assessor or it loses all point. This can only lead to the conclusion that our continued use of atypical schools such as Laboratory Schools as demonstration centers has been and is incredible. Convenience to the target system is a relative criterion and included only because innovation research in other fields has indicated that target systems will not go out of their way to avail themselves of demonstration opportunities.

Let us re-emphasize the criterion of evidential assessment. "Showing and telling" is not demonstrating in the sense in which the term is here employed. The end result of demonstration, to build conviction on the part of the target system, can only occur in a legitimate professional sense if the target professional can undertake professional assessment; and he can only do this if the demonstration provides evidence which can be examined thoroughly and critically.

The Adoption Process Phase

Assuming that the target system is convinced of the efficacy of the invention there should be an opportunity to try out the invention, without substantial fear of failure, in the context of a particular institution. This trial period is not a period of simple "trial and error" but time during which familiarity with the invention can be established and during which a basis can be provided for assessing the quality, value, fit, and utility of the invention in a particular institution. Several general criteria can be applied at this stage. Is the invention adaptable to the characteristics of the local scene -

does it have to be bought "whole hog" or not at all? If so, what impact will this have on local operations? Are there problems of feasibility not picked up in the earlier field trials? It may, for example, require a high level of professional performance in an area of marked weakness in the local system - a weakness which cannot be quickly remedied. How does the invention act in this naturalistic setting with these professionals? This criterion is comparable to the earlier performance evaluation employed by the engineers who originally packaged the invention, but here the interest is in the action of the invention in relation to the particular situational circumstances.

The trial stage has certain unique psychological properties that warrant its use even in cases where earlier field tests have left no doubt about the proper action of the invention in the local situation. The experimental air associated with trial has the same invigorating properties claimed by Stephen Covey for action research; participation in trial experiences may persuade many otherwise reluctant adopters. Further, the trial experience may provide a kind of vicarious involvement with the invention that psychologically compensates the adopter for his possible lack of involvement in earlier research, development, or diffusion phases.

The process of installation, or fitting the characteristics of the invention to the characteristics of the adopting institution, may be an exceedingly complex and time consuming stage. It may require substantial re-designing, extensive personnel retraining, or modification of other elements of the operating system which conflict

with the invention. The criteria for evaluation are the conventional administrative criteria of effectiveness, the extent to which the invention accomplishes what it purports to accomplish in relation to the system's objectives, and efficiency, the extent to which these accomplishments can be achieved in relation to the system's available resources. The application of these criteria implies the operation of some pattern of quality control within the system which will allow for the measurement of impact of a change on the operating system. Without this quality control, any effective application of these criteria is nearly hopeless.

Finally, we come to the process of converting the invention into a "non-innovation" so far as the adopting system is concerned. This implies establishing the invention over an extended period of time and valuing and supporting it as a regularly accepted component of the system. Whether this stage of institutionalization is, in fact, a part of the innovation process is a moot point debated by innovation theoreticians but it is certainly a critical step in the process for the adopting system itself.

Section II
Change Roles in Education: The Contemporary Scene and Recommendations

Had this paper been written five years ago, or even fifteen months ago, the analysis it attempts would have been much simpler to accomplish. Organizational Stability was a leading feature of the educational enterprise. But that stability is now rapidly evaporating. The effect of the Elementary and Secondary Education Act of 1965 on the process of educational change through the establishment of regional educational laboratories, the revitalization of state education agencies, and the establishment of local "demonstration" centers is very difficult to assess. Hence the analysis attempted here is likely to prove invalid quickly if the organizational changes now only dimly foreseen nevertheless materialize with the speed of which they seem capable.[16]

Change Roles: The Process of Research

The traditionally institutional role in research on education has been filled by the college and university. The bulk of the research activity has been divided almost equally between the educationist, i.e., the researcher with a background in professional education, and the educational psychologist. Sporadic interest in the field has been evidenced by

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[16] A recent analysis of the changing structure of American education is provided by Burton R. Clark, in an article entitled, "Interorganizational Patterns in Education," in the September, 1965, issue of The Administrative Science Quarterly. Professor Burton suggests that, "At least in education, social forces are greatly increasing the importance of this area/i.e., interorganizational patterns/. . . . Leadership is moving into the interagency compact, the limited alliance, the consortium, the grants committee, the federation." (p.237). The authors concur with this analysis and suggest that it serves as a useful backdrop against which to view the emerging roles of change agents in this field.

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individuals with other disciplinary backgrounds, e.g., sociology, political science, economics. State education agencies, the Office of Education, and local school systems have served chiefly to perform a highly specialized role in this field, that of social bookkeeper. Efforts to operate serious research programs in these latter agency settings have resulted usually in a short flurry of activity and a long anticlimax of disillusionment.

This general casting of institutional roles in relation to educational research seems to us to be sensible and reasonable. In most social process fields, institutions of higher education assume the lead in "advancing knowledge" and operating agencies tend to absorb the social accounting function. However, the research production in this field has been weak and has not served as a substantial "basis for invention." It is not our intent in this paper to engage in a critical analysis of the field of educational research but there are certain role deficiencies which, we believe, have contributed to this situation.

First, researchers have always inhabited the periphery of the field of education. Cut off from dialogue with practitioners they have been poorly supported and lowly regarded. Research in professional schools of education has been considered a luxury and this judgment has been reflected in the training in research provided to practitioners. It has also resulted, with apologies to our research colleagues who cherish their independence, in a lack of organization for research so that research efforts have tended to be short run and isolated.

Second, the base of participation in research on education within the university setting has been far too narrow. Educational psychologists have very nearly pre-empted this field as a specialized professional undertaking

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of their own. Consequently, the substance of knowledge in education accumulates primarily in terms of one methodological and substantive orientation.

Third, operating agencies in education, e.g., state education agencies and local school systems, have never clarified their role in relation to research and have operated ill-conceived programs which neither added substantially to what is known about education nor served legitimate local administrative purposes. These programs, however, contributed substantially to a misunderstanding in the minds of practitioners concerning what research is all about and what it can and cannot do.

Fourth, research efforts in education have seldom extended beyond the scope and capabilities of a single institution except in the cases where one agency (generally a university) used another agency (generally a school system) for data gathering purposes. As a matter of fact even the concept of team research has been accepted slowly in this field, Educational research studies have been small, individualistic, short-term efforts with little follow-up (e.g., even the concept of replication has been nearly lost as a scientific tool in this field).

Fifth, foundations have assiduously avoided the support of educational research. While on the one hand repeatedly emphasizing the risk nature of their capital and the venturesomeness of their spirit, foundations have nevertheless found it best to adopt a "play-it-safe" policy. This attitude is strange indeed when one considers the relative ease with which private foundations could elect to support promising individuals or unique ideas in contrast to governmental agencies with their aura of public responsibility.

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We are led by these considerations to make the following recommendations regarding research:

Recommendation #1 - Professional schools and colleges of education must accept the production of new knowledge as an objective equally as important as the training of professional personnel. To support this objective, operating agencies, and particularly the Federal government, must continue and expand the support of individual and institutional programs of research and research training. Educational practitioners will have to develop a new attitude toward the researcher and toward educational research as a career and must invite the participation of the researcher in the main flow of American education.

Recommendation #2 - If universities are to serve the chief institutional role in multi-disciplinary research on education, special programs and inducements will have to be offered to involve individuals from diverse disciplines in this activity. Initial instructions and guidelines from the Office of Education on the research training programs and regional educational laboratory programs indicate that the Federal government is attempting to encourage a move in this direction. Foundations, because of their broad-based contact with the University, could play a particularly vital role in this connection.

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Recommendation # 3- Local operating agencies in education should abandon once and for all the notion that research (advancing knowledge in education) is a necessary and desirable program function.[17] In lieu of this rainbow-chasing, those agencies should concentrate on the use of research, evaluation, and research-like activities in serving vital local administrative purposes, e.g., quality control, social bookkeeping, and stimulation of the innovation process (e.g., action research). A vital program need for the entire change process can be served if this strategy is followed.

Recommendation # 4- The educational community should take full advantage of the funding possibilities offered by the U.S. Office of Education's research and development centers[18]

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[17]This is a good point at which to enter a disclaimer. In discussing individual and institutional roles one must keep in mind that anyone or any agency can assume any role, no matter how far-fetched it may seem on the surface, if they wish to do so badly enough. Local school systems can and have operated basic research enterprises. Individual classroom teachers by sheer force of hard work have conducted occasional sophisticated research studies. The recommendations made by the authors represent what seems to them to be a reasonable role strategy. It is obviously not a God-given order of events (we simply make it sound that way).

[18]Parenthetically, it should be noted that the U.S. Office of Education's first efforts to establish research and development centers appear not to have been wholly successful as efforts to mount inter-agency and inter-disciplinary research compacts or systems. As a matter of fact, certain of the centers appear to be vehicles for supplying institutional research grants of the sort which have grown up within the National Institute of Health Program. This should not be allowed to become the pattern for this program and, to forestall it, the Office of Education might well consider institutional research grants as a necessary and useful extension of their research support program.

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and regional educational laboratories. If such inter-agency compacts can be made functional, much of the "sting" in recommendation #3 for local school systems can be removed since these agencies can find a new and vital relationship to the university's research program. The utility of this inter-agency, inter-disciplinary approach has been exemplified by the curriculum development projects of the National Science Foundation, even admitting that these were quasi-research efforts which would probably better be classified as development enterprises.

Change Roles: The Process of Development

If a single weak link can be identified in the innovation chain in education, it has been in the area of development. Why is worthwhile research sitting on the shelf? Because there has been almost no attention given to engineering it to the point where it was worth diffusing. The primary organizational mechanism for development has been whatever resources the local school district could divert from its regular operation to support curriculum development efforts by teachers. Colleges and universities have made a meagre contribution in the field through "service" operations usually housed in a unit called a bureau of field services; through the efforts of individual professors generally supported by local districts via consultant fees, or by publishers; and through spotty special efforts of the school study council variety. With singular exceptions such as the New York State Education Department's recently established Center on Innovation in Education the state education agency contribution to development has been limited generally to the modest production of syllabus

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guides and materials.[19] Without much doubt, the publishers and testers have been the primary development agencies in American education, providing a national program of instruction for the schools almost accidentally while the formally constituted bodies in education often criticized, but seldom ventured to fill, the vacuum.

This situation began to change about seven years ago. Prior to this time, the private foundations had begun to venture some capital in this field, as for example, the Carnegie Foundation's support of Biberman's mathematics program at the University of Illinois. Such a role seemed natural to the research-shy foundation, but despite the fact that all systems seemed to be "go" the foundation chose to withdraw from this arena and to concentrate instead on diffusion. In this latter phase their activities have been viewed with suspicion, particularly when diffusion was undertaken without previous development and evaluation. When the National Science Foundation instituted its massive programs of course content improvement in mathematics and science, development was formally recognized. The old era indeed, and private foundations became even less enamored of development activities.

More recently the Office of Education has followed NSF's suit and has extended these curriculum grants (albeit at a more modest support level) to other substantive areas. These first efforts were harbingers of a new day in organizing and supporting development efforts in education and the Elementary and Secondary Education Act (ESEA) of 1965 creates the opportunity

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[19]For an interesting example of changing state education agency interest in the development process and evidence of a new role for local school districts in the process, the reader is referred to a recent publication of the New York State Education Department, Center on Innovation, "Title III Guidelines: Elementary and Secondary Education Act of 1965," and Norman D. Kurland, "Some Observations on Curriculum Development"--a mimeographed report by the Director of New York State's Center.

to extend the development function to cover activities much more far reaching than simple course content improvement projects. The diverse patterns possible under Titles III and IV of the Act and the specific programs for regional educational laboratories and demonstration centers will almost certainly result in what Professor Burton typified as "the interagency compact, the limited alliance, the consortium, the grants committee, the federation."[20] We will not attempt to predict the nature of these relationships but we will present for consideration several recommendations which may make it possible for existing agencies to take advantage of the opportunity now presented to education to solidify this weak link in the chain of innovation:

Recommendation #5 - Colleges and universities must come to recognize development activities in education as a legitimate function of the institution similar to their development programs in engineering and agriculture. They must accept a role as one agency in an interagency complex attacking these problems and should probably be prepared to organize some type of functional unit to carry out this responsibility. Personnel need to be trained to fill educational engineer, field tester, and county agent type roles and totally new patterns of preparation will be required to meet this need.

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[20]See footnote 16.

Recommendation #6 - Local school districts should abandon once and for all the notion of "going-it-alone" in the development process while at the same time increasing many-fold their fiscal and personnel committments to the area of development. They should initiate and participate actively in inter-agency development compacts, and provide substantial released time for the best of their own personnel to be retrained as inventors and engineers and subsequently to perform as development team members in area, regional, and national projects.

Recommendation #7 - The Office of Education should press quickly for the establishment of a national communications network which can tie together the diverse components of the new regional and area development centers (including both the regional educational laboratories - Title IV and the demonstration centers - Title III). Early emphasis in the expenditure of Title III monies should be placed on development rather than diffusion since the success of any diffusion effort will be hollow unless the development phase is productive and substantial.

Recommendation #8 - State education agencies might well consider the example offered earlier from the New York State Education Department. Through coordinative and stimulatory activities these agencies can link together the Title III centers in their

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states into a development network which can tackle problems beyond the scope of any individual center. The state department might also consider employing technical consultants on various phases of development, e.g., audio-visual production, to assist local centers in their state.

Recommendation #9 - Private foundations should re-enter the phase of development. Their efforts would be much more welcome here than in the phase of diffusion, where their behavior is often suspect. Their assistance in opening up new areas (as contrasted with NSF's and OE's efforts aimed largely at refurbishing established areas) would be especially welcome.

Change Roles: The Process of Diffusion

The informing function of dissemination was the original and classical function assigned to the United States Office of Education. It has attempted to fill this role through employing specialists in various fields, issuing publications, and sponsoring and attending conferences. Similar dissemination patterns have grown up in state education agencies and professional associations while colleges and universities and local school districts have tended to assume that the job appropriately rested elsewhere and was being accomplished reasonably well. These latter groups supported the pattern by providing budget allocations to send staff members to conferences and to purchase publications.

The term demonstration has been used in such a different context in education from the way in which it is being employed in this paper that it can almost be classified as an "open role." In a sense, it has been pursued for the purpose of "informing" rather than "convincing." This would seem to be the case, at least, when one considers the role of demonstration schools, demonstration teachers, or demonstration exhibits. These vehicles were designed to stretch the imagination of teachers -- to let them know about other practices and activities going on in the country -- to serve as models to emulate. The one notable exception to this pattern is represented by the demonstration projects of private foundations. The activities of the Ford Foundation, for example, in teacher education, team teaching, etc., have had a convincing or propagating purpose but in most instances have seemed to fail on the criterion of evidential assessment. Up to this point, the so-called demonstration activities of the Office of Education have seemed to be diverted toward field testing as defined in the development phase rather than demonstration as the term is used here.

If one overall criticism can be directed toward the diffusion process in education it can probably be summarized by labeling it impersonal and undirected or unplanned. On the first count, there has been nothing similar to the county agent or demonstration agent and no mechanisms similar to the experiment station. On the second count, no effort has been made to systematize and organize the pattern of conventional communication. At a more sophisticated level of criticism no strategy has been invoked to take advantage of what we

do know about communication networks, e.g., the two-step flow of communication hypothesis, the clustering phenomenon.

We would recommend that:

Recommendation #10 - The Office of Education should accelerate the development of its Educational Research Information Center (ERIC) so that a single automated storage and retrieval system is available around which to build a diffusion mechanism in education.

Recommendation #11 - The regional educational laboratories and state education agencies should be conceived as arms of ERIC for this purpose (probably as satellite centers) and both of these agencies, in concert, should employ and provide to local educational institutions, field agents whose sole function is to make available to practitioners the most recent information on educational development activities. To assist in this endeavor the Office of Education should initiate and maintain a catalog of inventions which summarizes all such efforts in the country.

Recommendation #12 - The regional educational laboratories and demonstration centers (i.e., local school district centers) should be conceived and planned as a national network for the demonstration of educational inventions and as the "key institutions" for an expanded program of direct demonstration in local districts.

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Change Roles: The Process of Adoption

In a real sense, the focus of discussion changes sharply at this point since there is no real question about role. The adopter or adopting system assumes the change role and the question becomes one of internal organization adequate to accommodate the role. Whether local school systems in this country have been or are now prepared to exhibit what Paul Mort called "adaptability" is highly debatable. If they are not, of course, the change process falls apart and attention to research, development, and diffusion becomes a farce.

First, let us recall that the recommendations to this point have called for a new and dynamic role for local schools. These are not agencies waiting passively to receive inventions concocted by experts for adoption by the so-called target system. This is an important differentiation in role and one which we wish to emphasize. Active roles in invention, design, and demonstration were posited and the fulfillment of these roles would establish a local setting for innovation which will be critical.

Now, if the district itself and its internal organization is to fulfill its change role adequately, the present situation must be markedly altered. The district cannot continue to be characterized by a "do-it-yourself" complex, trying to rediscover the wheel in local curriculum committees while the research arm of the district, if any, is diverted to status surveys and administrative data gathering. Neither activity (curriculum or research) is typically supported at a level which would allow for real progress. This will have to change and we suggest that:

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Recommendation #13 - Each and every school system should affiliate itself as a member of an inter-agency compact (e.g., regional educational laboratory) for educational change, allocating necessary resources to become an active participant in the program of the compact.

Recommendation #14 - Each district should identify internally or employ high level personnel (master teachers) whose charge it is to serve as liaison between the district and outside change agencies, to mount and carry out demonstration and trial projects within the district, and to work with teachers and other personnel in the district who are engaged in installing and institutionalizing new programs and practices.

Recommendation #15 - A quality control center should be established in those districts large enough to justify its existence--others can accomplish this on an inter-district basis--to assess continuously the health of the system and the impact of changes introduced into the system.

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Recommendation #16 - A development division should be set up (probably in lieu of the current office of assistant superintendent for instruction)[21] whose primary purpose

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[21]We are not unaware of the tremendous load of the line responsibilities now carried by such offices ranging from personnel recruitment to back-ordering. Obviously these tasks have to be carried out but not, we would contend, in the one office in the system where concern should be primarily for improvement rather than maintenance. In the same manner, we know that administrative data gathering is important but not as a function of the quality control center.

it should be to coordinate the development activities of the system and particularly to work on problems of operationalizing and establishing inventions.

Recommendation #17 - The much-abused concept of action research should be revitalized and recast as action research and development. In this instance, we are referring to the use of replications of research and development projects in the local district, involving classroom teachers, for the purpose of setting the stage for change in the system and insuring broad involvement in the district's program for change.

Section III
Summary

Figure I and the seventeen recommendations represent the summary of our ideas. However, we feel that certain actions noted in the recommendations can briefly be reviewed for emphasis and convenience. We wish, then, to reiterate our suggestions that:

1. Professional schools of education be encouraged immediately to establish graduate programs appropriate for the new roles called for in the changing process of change in education, e.g., educational engineers, quality control experts, educational field agents.
2. Local school systems be encouraged to redirect their efforts in research and curriculum to focus on their role as adopters in the process of educational change, and particularly, that they assume responsibility for these functions as exemplified through development and quality control centers.
3. State education agencies and the Office of Education be encouraged to view the ESEA of 1965 as a vehicle for establishing a strategy for educational change in this country, and take the steps necessary to prevent this legislation from becoming merely supplementary support to extant and inadequate patterns for change in education.

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